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ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

Published:

— with international search report

— before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
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29 July 2004

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: IMPROVED TRANSPORTERS AND THEIR USES

(57) Abstract: The present invention is generally related to plant genetic engineering. In particular, the invention is directed to nucleic acids and methods for conferring salt tolerance on plants and other organisms.

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

023070-127300PC (PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 23070-1273PC	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/US03/21549	International filing date (day/month/year) 09 July 2003 (09.07.2003)	(Earliest) Priority Date (day/month/year) 12 July 2002 (12.07.2002)
Applicant THE REGENTS OF THE UNIVERSITY OF CALIFORNIA		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the Report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☒ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (See Box II).

4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No. _____



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.



None of the figures

CSW

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/21549

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12N 15/29, 15/09, 15/63, 15/82, 15/90; A01H 5/00
US CL : 435/410, 419, 468; 536/23.6; 800/278

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/410, 419, 468; 536/23.6; 800/278

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST, Agricola, CAlplus, Biosis, GenBank, EMBL, Geneseq, PIR

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 99/47679 A2 (BLUMWALD et al.) 23 September 1999 (23.09.99), page 43, line 5 to page 57, line 7; page 61, line 1 to page 67, line 6.	1-15, 17, 19, 20
Y	WO 01/033945 A1 (UNIVERSITY OF CONNECTICUT) 17 May 2001 (17.05.2001), page 6, line 19 to page 7, line 22, page 27, line 26 to page 48, line 1, page 48, line 22 to page 50, line 9.	1-15, 17, 19, 20
Y	QUINTERO et al. Functional Conservation Between Yeast and Plant Endosomal Na ⁺ /H ⁺ Antiporters. FEBS Lett. 2000, Vol. 471, pages 224-228, see pages 225, 227.	1, 10-13, 19, 20
X	GAXIOLA et al. The Arabidopsis thaliana Proton Transporters, AtNhx1 and Avp1, Can Function in Cation Detoxification in Yeast. Proc. Natl. Acad. Sci., USA. February 1999, Vol. 96, pages 1480-1485, see pages 1480, 1481, 1483, 1484.	14, 15
Y		1, 9, 10-13, 19, 20
X	Database Genbank, Accession Number AF510074, BAEK et al. Isolation and Characterization of a Na ⁺ /H ⁺ Antiporter Gene From Arabidopsis. 23 May 2002, pages 1-2, see whole document.	14, 15
Y		1, 7, 10, 19, 20

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

24 January 2004 (24.01.2004)

Date of mailing of the international search report

27 MAY 2004

Name and mailing address of the ISA/US

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/21549

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claim Nos.: 16 and 18
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claims 16 and 18 were not searches because they attempt to limit polypeptides of their parent claims. However, the parent claims are not directed to polypeptides. The scopes of claims 16 and 18 are not clear.
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.